

Sugarcane Bioenergy Inquiry 2025

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29 September 2025

Mr Stephen Bennett MP
Chair
Primary Industries and Resources Committee
Member for Burnett
Parliament House BRISBANE QLD 4000

Dear Mr Bennett,

RE: Inquiry into sugarcane bioenergy opportunities in Queensland - RDA GW Initial Consultation Submission

Thank you for the opportunity to submit feedback to the Inquiry into sugarcane bioenergy opportunities in Queensland and RDA GW ability to provide feedback to Queensland Parliament's Primary Industries and Resources Committee Public Hearing - Tuesday, 9 September 2025 - Inquiry into Sugarcane Bioenergy Opportunities into sugarcane bioenergy opportunities in Queensland.

Regional Development Australia Greater Whitsundays (RDA GW) congratulate the Committee and the Parliament for launching this inquiry. There is significant opportunity for a sugarcane-based bioenergy industry in Queensland, and any policy and funding steps taken by the Queensland Government to support and accelerate this potential industry will have lasting benefit for Queensland sugarcane industry and its broader supply chain and communities.

Introduction to RDA GW and those involved in this submission

RDA GW is part of network of 50 RDA operations (committee and staff) across Australia. The RDA network is a vital link between regional stakeholders and all three levels of government. Our RDA committee members act as real-time advisers to government on critical regional development issues, opportunities and challenges in their regions. RDA GW covers the geographical areas of the Mackay Isaac and Whitsunday LGA's, and this geographical area aligns with the Plane Creek, Mackay and Proserpine sugarcane, milling production and manufacturing districts.

RDAs are critical to the delivery of the Australian Government's vision for regional Australia and support the implementation of the Regional Investment Framework. RDA committees work with their stakeholders to identify key priorities that will benefit the economic future of their region. The themes captured in the RDA Key Priorities Matrix are:

- Workforce and population development
- Innovation skills and workforce
- Diversification of industry
- Environmental and Natural Assets – land, water and energy/renewables



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RDA GW has the fortune of being well versed in the matters of agriculture and agribusiness and aligned manufacturing development. Committee members involved in RDA GW includes representatives with a long and strong track record in rural development and directly sugarcane production and processing and bio energy development.

RDA GW representatives supporting this submission include

- Mr Paul Schembri - Mackay Sugarcane producer, RDA GW Committee Member, Current Director of Sugar Terminal Limited, previous Chairperson of CANGROWERS Australia. (2013-2022)
- Mr Stephen Cutting – Currently Principal, Process Systems at Aurecon, ex CSR/Sucrogen (now Wilmar) Milling Engineer, Member of Mackay Bio futures Leadership Group and leading knowledge export and advisor relating to Biomanufacturing.
- Mr Robert Cocco – current CEO RDA GW, previous CEO of Reef Catchments NRM Group (2007-2017), ex BSES (now SRA) Regional Manager Mackay and Burdekin (2004-2007), previous Manager Burdekin CANEGROWERS (2001-2004) BSES (now SRA) Extension officer (1992-2001), Current Committee member Qld AgTech Alliance and Primary Industry Proser 2050 Central Qld Advisory Group, previous Director of the Global Sugar Sustainable Roundtable – Bonsucro (2016-2019).

Attached is RDA GW feedback as per the Inquiry's Term of Reference and a PowerPoint providing background information and further context pertaining to bioenergy opportunities.

Yours sincerely,

.....
Rob Cocco
Chief Executive Officer
Regional Development Australia
(Greater Whitsundays) – RDA GW

.....
Stephen Cutting
Deputy Chairperson
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1. Immediate Next Steps

- i. Aligning state and federal government programs and interests concerning bioenergy, biofuels and bioproducts. Where alignment supports a shared and common framework and programs of delivery and common language. Most importantly a focus toward ability to have robust debate equitable input toward development of a bio-futures industry. An ability to review policies and programs the support harmonisation of development opportunities across the federal and state landscape relating to the development of bioenergy, biofuels and bioproducts.
- ii. Beyond this Inquiry into sugarcane bioenergy opportunities in Queensland, RDAGW suggests that there is strong merit in the government creating a Bio-futures Alliance and continuing if not ramping up the discussions and coordination of a future bioindustry in Queensland.
- iii. The role of the alliance being to further hone and develop a program of action to realise the successful development and provision of a bio-futures industry in Queensland.
- iv. The Bio-futures Alliance combining resources from multiple agencies in collaboration with industry and regional development bodies and professionals with intimate knowledge of biobased industry development, manufacturing, and markets.
- v. The delivery arrangements in support of a Bio-futures Alliance could include consideration toward.
 - a) A formal representative link to federal agencies with direct interest and initiatives aligned to bioenergy and biofuels and advanced biomanufacturing.
 - b) Cross state government agency involvement to support bio-industry and direct and indirect supply chain development.
 - c) State and regional based representation - given biobased/bioenergy industry development is occurring at state and regional geographic scales.
 - d) Technical knowledge and expertise advice toward all thing's bio-futures innovation , manufacturing, and marketing.
 - e) The establishment of an integrated structure able to support a Queensland scale bio-futures alliance and in addition the development of regional bio-futures alliances to foster enhanced within region collaborations and cross regional collaborations with focus toward creating economies of scale and ensuring efficient and effective use of resources and funding.



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2. Collaboration and Partnerships

- i. The sugarcane value chain has a history of internal conflicts and competition aligned behaviour, miller v/s producer or region v/s region or industry v/s government - at the same time there have been examples of industry collaboration and cooperation. There is a need to see improved trust, relationships and collaboration if successful bio-based industries are to be established. Government has a role in mediating /facilitating these discussions and relationships and where possible furthering shared and collaborative actions. Perhaps a shared focus and a prize of a vibrant bio-based manufacturing industry and its link to more sugarcane production and processing and its supply of food, fibre and foliage can be a strong motivator toward active collaboration.
- ii. There is a need for government to review policies that increase costs and restrict innovation. While RDA GW is not an expert in various areas of regulation pertaining directly to the sugar industry it is clear from listening to the sector that there are major policies that at present are restricting large scale investment in the sector. Such regulation and policy area of focus include (but are not limited to) environmental and land use regulations and sugar industry regulations as they relate to marketing choice and precontract arbitration. While RDA GW is not seeking to offer a direct positive or negative view regarding these regulations it is evident that at present such regulations are driving a lack of investment interest from those stakeholders already part of the industry. The role of government should be to mediate a set of solutions to overcome the barrier real or perceived via these regulations and reach compromise that can see industry stakeholders reinvesting toward innovation and business development.

3. Location, Location, Location

- i. In considering the locations to establish a bio-based industry, consideration must be given to the enabling infrastructure, available services and broader supply chain and community resources that are available. Bio-based industry development and aligned feedstock options and locational opportunities are a plenty in Qld. Considerable government funding current and past has been provided to these feedstock and locational assessments. Many private bio-based business advocates have outlined small and large projects for government consideration, and many have benefited from government funding support in the development of feasibility studies, business cases and master plans. Over many decades bio-based project opportunities come and go and most remain non-viable or are unable to achieve an industry scale of development.
- ii. Rather than continuing to utilise government funds in exploring a range of feedstock and possible site options and spreading limited government funding perhaps an approach which looks at the fundamentals required to support a new industry scale level of development and being able to leverage from existing infrastructure, services and capability offers a more likely positive outcome.



iii. Ideally the assessment of bio-based industry production capability would early on consider the collective integration of the following attributes to undertake the development of new industry and where best to locate these new bio-based manufacturing assets and opportunities

- a) Arable land.
- b) Water availability for primary production and manufacturing- existing and future supply.
- c) Affordable energy access and provision to support primary feedstock production and manufacturing.
- d) Local producers with knowledge and skills and interest to produce feedstock
- e) Freight and transport solutions that are cost effective and in place for domestic and O.S supply (inbound and outbound).
- f) Digital communication to support processes and systems
- g) R & D provision and structures - to support primary feedstock production and manufacturing solutions.
- h) Engineering and manufacturing capacity and project management capability in region to support infrastructure development and on-going maintenance.
- i) Training and Skills development services to support current and ongoing workforce access.
- j) Broader population development capability to support workforce attraction and retention and population growth which in turn supports broader access to community services and capability. These include,
 - Access to appropriate health and social services.
 - Access to education and childcare services.
 - Housing access.
 - Social activities and infrastructure to support people and community.

iv. In this regard the sugar industry with all its infrastructure and support process and services and its existing hardwired link to major regional community locations in Qld offers the best opportunity to generate a new industry at scale. To that end perhaps it is time to focus on supporting and expanding a current crop and feedstock and industry and its applications in using other crops as part of sustainable regenerative farm practices and where all the required attributes to launch a success bio energy future are in place.

4. Broaden Future Scope - More Than Bioenergy and Sugarcane

- i. RDA GW has noted the inquiry focus, Sugarcane Bioenergy Opportunities and while supportive of this focus suggests further inquiries by the Queensland Parliament's Primary Industries and Resources Committee would benefit from a broader focus that includes.
 - a) All biomanufacturing opportunities derived from sugarcane feedstock – including production of alternative food products, nutraceuticals, pharmaceuticals and the like.



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- b) Broader biorefining opportunities and commercial development from proteins, sugars, lignin, oils and fibres. The broader consideration supports opportunities for additional value add from feedstocks that are most often also present in large supply (or could be provided) from the same production areas. Equally in a crop production context the co-production of alternative cropping within the same sugarcane production regions supports best practice regenerative agriculture process and improved environmental sustainability and supports opportunities for better utilisation of infrastructure and operations. In addition, the consideration of alternative feedstock and biomanufacturing processes creates economies of scale, shared infrastructure, enhanced asset utilisation and cross energy synergies within what could be a common bio manufacturing precinct.

5. The role and benefits of sugar cogeneration in Queensland's electricity generation mix, including existing capacity and potential for expansion.

- i. The Qld sugar industry is already an active participant in renewable electricity generation via cogeneration
 - a) Over 440MW of cogeneration capacity existing at mills in Qld already. Such energy development supports on site milling operations and electricity exports to the grid and where cogeneration acts in similar way to baseload power as a reliable source of electricity and where cogeneration can support decarbonisation by potentially reducing emission.
 - b) The Australian Milling Council submission to the 2025/26 Federal government pre budget submission indicates the sugarcane industry could expand cogeneration to 1GW and in doing so provides up to 2.1TWH per year of additional energy that would support lower electric wholesale prices by between 10%-15% between 2028-2035, this represents a saving to Qld consumers of c.\$9B 2029-2050, where this reduction in wholesale generation prices will be largely achieved by reducing the number and severity of extreme supply shortfalls.
- ii. Most sugar cane mills in Qld are well aged assets- there operations were designed to consume vast quantities of bagasse to fuel boilers which produce steam to power the mills operations. The advent of cogeneration opportunities saw many mills look to export excess electricity manufactured via steam run turbines generating power. The efficiency of many of these systems is based on old and poor performance systems. Conversations with milling engineers and operators indicates that with investment the mills can upgrade operations to double or triple electricity production from the same volume of bagasse. Unfortunately, the provision of renewable energy development incentives afforded to many wind and solar projects has not been granted to cogeneration producers or developers (mills). Often the cogeneration projects are seen as small and not game changing in individual capacity at respective sugarcane mill sites relative to solar and wind type projects.



- iii. To achieve such generation capacity via cogeneration there are significant capital cost incurred to support cogeneration expansion and regulatory and operational challenges. These include,
- a) Mills area not scheduled generators - limiting revenues that are available.
 - b) AEMO dispatch obligations and compliance can be of risk to mills and commercially impractical.
 - c) Revenue uncertainty is apparent given Large-Scale Generation Certificates (LGC's) are being phased out by 2030, and it is not certain what mechanism will replace LGC's.
 - d) Sugar cogeneration does not have access to the Capacity Investment Scheme (CIS)
 - e) Market Incentives and rules must support quantifiable benefit or cogeneration capacity expansion support to facilitate investment in capacity expansion.
- iv. In theory opportunity exists to explore direct power purchase agreements between millers producing power and the producers supplying the biomass feedstock. Power Purchase Agreements (PPAs) could offer a predictable revenue stream for bagasse cogeneration facilities by potentially locking in long-term contracts between generators and buyers of power. But most mills are non-scheduled, non-market generators and are thus generally prohibited from entering PPA options.
- v. The National Energy Market (NEM) does not adequately support generators capable of providing reliability or firming services. While initiatives like the Capacity Investment Scheme (CIS) can see government revenue underwriting provisions. Biobased cogeneration in sugar mills is most often excluded or non-competitive given their scale and the fact they are non-scheduled, non-market generators. It is clear existing market signals still undervalue firm, low-emission, distributed energy sources like bagasse cogeneration. Opportunity exists for NEM policy reforms and CIS to better monetise the value these generators provide, especially during critical peak demand periods.

6. Market, Regulatory, and Infrastructure Barriers to Increased Bioenergy Production From Sugar

- i. RDA GW is aware of many barriers (but where barriers can be overcome with good policy and programs of support) to increase production of bioenergy and other bioproducts from sugarcane and while not an exhaustive consideration RDA GW would outline the following for consideration.
- a) The selection of high value, high consumption production for local and export markets is ideally the focus for priority bio manufacturing development and investment.
 - b) Bio industry projects created by the 'Demand side' of market opportunities need to be weighed up with realistic assessments of the potential growth on the 'Supply side', if sustainable businesses are to be developed. Equally the limitation on the supply side is not only aligned to feedstock supply considerations.



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- c) There is a need to understand core market and cost drivers and their interrelations within the value chain.
- d) There is a need to understand and improve the relationships within the value chain and reach solutions that share risk and reward pertaining to investment and revenue – directly this will require changes to current sugar, and sugarcane byproduct revenue arrangements to better share proceeds and share risk.
- e) It is critical to address the key technical, enabling infrastructure and economic issues for establishing bio industries in Qld across the entire farm to port value chain.
- f) A refocus in overarching strategy that includes an ongoing product mix derived from sugarcane that includes sugar, bioenergy and other bio manufacturing production. Rather than sugar being seen as a heritage commodity there is need to understand the role sugar has played and will continue to play regarding food preservation and feeding the world's population. An acceptance and understanding that most of the sugar sector millers are also sugar traders and as a result sugar production and its trade will continue to be core to business.
- g) Any bio manufacturing opportunities are reliant on the ongoing provision and preferably the growth of sugar cane feedstock supply. Such growth allows for support of current markets and future alternative needs and uses and creates diversity of product options and use at scale. Swapping one mono market focus for another is not sound business development. Clearly there is significant scope to broaden the Qld sugar industry product mix and in doing so alter the current 90% + focus of total revenues being derived from sugar to something in the order of 60% + via the development of other bio-manufacturing products.
- h) Historically discussions concerning increases in sugarcane production is focused on more area under production, and policy that supports the maintenance of good agriculture land under production. There is a need to ensure cultivated land area loss is limited, however there will always be the need for urbanisation and general housing allotment development that will in areas like Mackay and the Whitsundays see some sugarcane land area loss attributed to population development which supports more people and more services and regional growth. The greater area of concern regarding cultivated land loss is attributed to acreage lifestyle or hobby blocks where often sugarcane farming areas of up to 100ha in land size are purchased taken out of production (fenced and support grazing animals) and have no major focus on direct primary industry commercial return. The sale of such land areas is most often a result of high economic sale yields from the sale, an ageing producer demographic, limited farm succession, more attractive work options



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linked to other sectors in the region and declining sugar industry sector confidence regarding a viable future. The development a bio industry derived from sugarcane feedstock and companion cropping in fallow areas could provide a much-needed circuit breaker to the loss of farmland to hobby farm investors.

- i) RDA GW would also suggest a focus be placed on more production yield (tonnes of sugarcane /sugar per hectare) from the existing areas of production. Pre-1990's the Mackay/Sarina region average crop yield was close to 100 tonnes cane per hectare - today the average is between 74-82 tonnes of sugarcane per hectare. Analysis of sugarcane crop yields within production zones in the region showcases a large difference in yield per hectare between farms on similar soil types, water availability and with similar farm inputs. The reasons for the high level of yield difference despite similar yield potential can be attributed to many factors, however in the main it boils down to adopting production husbandry practices that align with best leading practices, inputs and operations and doing the right thing at the right time. What is of interest is that in the main these desired best practice operations are well known and are backed by strong industry R & D and adopted by innovative producers. Programs funded by industry and government are required that super charge provision of these production maximisation solutions via sound extension (farm practice change advice) and farm demonstrations. At the same time solutions that can reduce cost of production and increase returns to producers are required to solicit a stronger positive feedback loop encouraging higher production rates. Critical elements of higher crop production rates could directly include.

- Better milling performance – increasing mill crush rate and reducing stoppages in the season and reducing frequency of stand over crops.
- Maximisation of irrigation water use - research indicates 1ML of irrigation water, returns of 7-10 tonnes of sugarcane per ML in region (can be as high as 20 tonnes per ML), Currently irrigators in the sugar industry in the region on average use less than 20% of available water allocation (some areas less than 10%) – combined the volume of allocated irrigation water regularly not utilized totals on average just over 108,00ML per annum (15 year average) - this equates (conservatively) to almost 570,000 tonnes of additional crop production per annum.
- Additionally, there is a need to investigate feasibility and considerations toward upgraded bulk water delivery systems and solutions via upgraded delivery infrastructure given the relatively high delivery costs attributed to increasing energy costs and aging water supply assets, given the design of the water delivery systems dates to the 1970's and 1980's for respective water delivery systems in the region.



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- The adoption of regenerative farming systems and ensuring soil health is maximised. Industry research for over three decades concludes the negative impacts of sugarcane monoculture and farm practices on declining soil health, soil biology, soil carbon and its impacts on crop yield – more importantly the industry has recommended solutions to overcome these inhibitors, yet adoption of such practices is relatively low.
 - The adoption of new varieties, clean seed material propagation and practices (including tissue culture) and the upkeep of high levels of biosecurity is fundamental activity to ensuring increased production rates.
 - The uses of Integrated Pest Management solutions to reduce the impact and competition effects seen from weeds and pest incursions. Significant research in the 1990's completed by BSES (now SRA) concluded that weed competition even at early weed growth can have a significant yield impact on sugarcane- as little as 4 weeks of weed competition (post sugarcane plant cane emergence) can reduce sugarcane yield by as much as 10 tonnes cane per hectare while 8 week of weed competition can reduce yield potential by 20 tonnes of sugarcane per hectare.
 - Utilisation of industry accepted nutrient management best practices at farm and block scale as opposed to general region wide methodologies.
- ii. There is lack of value chain alignment when it comes to proceeds derived from the sugarcane value chain and its by-products (sugar, ethanol, molasses, cogeneration, trash, mill mud, bio-dunder and other bio-based products). At the heart of this lack of alignment is the current sugar payment formula and other by-product revenue allocation arrangements that generally support
- a) 2/3 of sugar proceeds being returned to producers (farmers) and 1/3 to millers.
 - b) Millers then having access to all other value add proceeds - all be it the millers have in the main solely invested in manufacturing and supply of these value-add products.
 - c) RDA GW suggests that until such time as proceeds/revenues and investment risks from sugar, and byproducts are equitably spread across the value chain it will be difficult to gain strong support and shared interest toward bio-futures. In all commercial transactions higher returns are commensurate with higher risk, all parts of the value chain must share in risk and reward. This also means that shared and collaborative solutions are required regarding bioproduct opportunities. There is a collective benefit and need to look past the differences between miller and growers and not view solutions solely through regional only opportunities. Effectively the focus should first be toward growing the total revenue pie and then



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once the new and additional revenue opportunity is understood concurrently work on the divisional proceeds of revenue in a shared risk/ reward arrangement. RDA GW notes that in 2005 the then Mackay Sugar and its growers agreed to implement a new cane payment system. The aim of the new system was to better align the business drivers between the mill and its growers and as a result improve business decision making. The technical basis of the new cane payment system included a fixed sharing of the revenue from sugar cane between the mill and growers. Further, the new system replaced the CCS formula with a new estimate of recoverable sugar (PRS) and introduced NIR for payment analyses. Significant mill and grower consultation processes led to the agreement to implement the new system, and this consultative approach perhaps showcases a methodology to successfully align risk and reward aspects.

- iii. It will be critical to ensure that Australian feedstocks and manufactured bio products are recognised by international certification frameworks, and that sustainability credentials and life cycle emissions values specific to Qld and Farm to Port value chain are calculated and incorporated toward product value determinations. Ability to have products that are certified to global sustainability standards also support an ability to explore premium payment and or preferential market access and can also support eco markets-based payments. Queensland's sugarcane industry operates under global exemplar industrial relations regulations and to a reasonable standard of sustainability, which may provide an advantage in international markets subject to alignment with global certification and verification systems, most of which require independent verification. Queensland should refrain from developing its own certification and verification frameworks and procedures and instead link to existing market and global supported programs. In supporting such an approach investment and use of AI tools and data management platforms that can capture relevant information is vital. Preferably the sustainability data sets are aligned to information that also supports improved respective decision making at the farming, harvesting, milling and transport and bio manufacturing operations level as well as supporting full chain of custody accreditation and verification.

7. Policy and Funding Mechanisms to De-risk Investment in Cogeneration and Biofuels by Manufacturers and Growers, (including examples of successful policy implementation from overseas and other industries).

- i. RDA GW welcomes the new Queensland Government's announcement in the 2025-26 State Budget of the Sovereign Industry Development Fund (SIDF). Although additional clarity about the SIDF's guidelines will be required. Australia has a relatively poor record when it comes to ideas and research translating to commercial operational solutions within the agribusiness sector.
- ii. There is a well formulated general rule of thumb that in terms of commercial development of services and products for every \$1 invested into R & D, you need \$10 to support early-stage



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- iii. development and \$100 for full commercial operations development. A review of Qld and Australian government business development programs highlights considerable level of investment in base R & D (usually via co funded grants) and a number of programs supporting full commercial development (usually via supportive loan scheme co funded by government) but little in the way of programs that support early-stage development.
- iv. It is hoped the SIDF can be used as seed funding to help prove up early-stage commercial development, technology and supply chains for emerging industries such as sugarcane-based biomanufacturing, for projects such as pilot plants. Ideally SIDF's focus is not aligned to large-scale grants or loans given the Commonwealth agencies such as the Northern Australia Infrastructure Facility (NAIF) serve this purpose and ideally there is a need to reduce policy or program duplication. We also believe that investor and off-taker interests will also be sealed through support to complete pilot scale assessments that includes smaller commercial scale sales to consumers to support further bankable and government loan support arrangements. Funding for feasibilities, demonstration plants and common user facilities in Queensland has already proven effective in establishing supply for essential commodities such as critical minerals.

8. The Research and Development Agenda to Underpin a World Leading Sugar-led Bioenergy Industry.

- i. RDA GW is aware that government and industry have in the past and through to today invested strongly toward R & D including in support of varietal development, production husbandry, manufacturing and diversification research through organisations including Sugar Research Australia, Department of Primary Industries, CSIRO, Queensland University of Technology, University of Queensland and other universities across Australia.
- ii. The collective focus and energy need to be invested in the documentation, and exposure of all this research. Directly an enhanced translation of the research into practice and commercial use.
- iii. RDA GW is aware of regional, and state led aspirations aligned to the development of Centres of Excellence for advanced sugar manufacturing and leveraging solutions that can integrate technologies like automation and AI while enabling world class efficiencies, sustainability and product quality in sugar and bio-based manufacturing. At present proponents of these Centres of Excellence and more broadly including departmental consideration toward Smart Farm precincts are siloed in their actions and approach and where proponent aspirations are in competition with each other. RDA GW believes there is opportunity for the government to play a role in facilitating collaboration of precinct and centre of excellence proponents. Clearly Qld cannot support replication of such precinct and centre of excellence developments



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9. Strategic land use and Regional Development Considerations Affecting Cane-growing and Sugar Manufacturing Capacity

- i. RDA understands there is substantial availability of industrial land suitable to support current and future Bio industry aspirations in all Qld regional areas in proximity to sugarcane production areas. However, in addition to land availability the selection of possible sites for bioenergy delivery and expansion must be also considering the following aspects.
 - a) Access to a supply of sugar cane, bagasse, trash feedstocks.
 - b) Access to and supply of abundant volumes of water.
 - c) Ease and proximity of connection of processes centres to the electricity grid.
 - d) Access to freight and transport connection – includes consideration toward low carbon freight solutions for both domestic and export functions.
 - e) Provision for waste management.
 - f) Access to suitable workforce skills and capability in region to support construction and operations – and or access to FIFO support and aligned workforce housing capability.
 - g) Solutions for additional workforce accommodation.
- ii. The above outlined parameters align to the role of government (with industry/community) in completing site and operational assessments as part of developing bioindustry State Development Areas. Furthermore, government can better secure future private sector development at these locations by ensuring selected SDA precincts are investment ready and in doing so have in play exemplar access to
 - a) Cost effective water supply.
 - b) Freight/transport solutions- feedstock supply and bio product export from sites, ease of people connection to the sites.
 - c) Electricity supply and export
 - d) Digital communications – upload /download capacity to support construction and operations functions
 - e) Waste management facilities and service (organic and other)
 - f) Site support ability for various bioenergy developers and suppliers to share access to inputs and where practicable leverage aspects of manufacturing inputs from each other e.g. sharing heat and energy needs
 - g) Skills direct and indirect workforce provision
 - h) Local access to engineering, fabrication and mechanical base repair capability
- iii. The dedicated provisioning of explicit land areas with the above commercially available trunk services requires a need to support a part methodology of “build it and they will come” (some risk) based on strong commercial expression of interest from bio energy manufacturers.
- iv. Any bioenergy precincts would also ideally be contemplating the integration of broader services that could incorporate general waste recycling and management (bio digestion /pyrolysis systems) for the region and its treatment of organics waste.



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- v. Strategically there is also opportunity to more broadly consider the options of development of such precincts aligning with the primary anchor tenant of such sites being newly constructed and operational sugar mills/bio factories in concert with other bio-manufacturing operations - such a development could drive infrastructure and operational solutions that transitions the sugarcane value chain to becoming more efficient and driving a quantum change in sector viability for the future and support the sugarcane sector for a further 50-75 years – just as the forefathers investment over 75 years ago is the mainstay of current sugar cane processing infrastructure and operations.

10. Benefits for Growers in Diversification Opportunities.

- i. It should be noted that the current sugar global arrangements and international demand for sugar anticipate seeing 1% annual growth. However, like most primary sector global markets it is forecast that price volatility will increase from year to year and a result we are likely to see increasing high and lows in sugar price over time. Recent evidence of this can be seen in the ICE 11 Price levels that saw lows of \$AUD 480 MT in April 2022 and highs of AUD\$735 MT in Nov 2023. The size and international nature of the sugar market means that this price is independent of the cost of production in Australia. While Australia is reasonably efficient in producing sugar there have been and will continue to be occasions where the world price drops below the cost of production in Australia.
- ii. RDA GW has previously in this submission outlined the need for refocus at the risk/reward arrangements constituted within existing sugar industry payment frameworks and an ability to go back to future as it were in exploring the previous Percent Recoverable Sugar (PRS) payment system and model adopted by Mackay Sugar in the mid 2000's. Additionally, history has shown that the producers within mill areas and across regions can pool opportunity and investment to support the ability to raise capital to support industry and services development. For example, in 2009 Queensland sugar producers partnered with Ravensdown Fertiliser to supply fertilizer to producers. In 2014 the arrangement failed due to low sales volumes and depressed world sugar price and failure to formally link agronomic expert advice to fertiliser sales as was offered by competitors. However, the operation showcased an ability for producers to plan toward shared industry investment and development with the right producer investment and incentive structures in place.
- iii. With the advent of diversification and biomanufacturing opportunities being validated as viable and with the provision of incentivising and innovative legislation for the industry across its entire value chain and across all ESG facets there is much to look forward too. For too long focus has been on how to split the pie when perhaps more focus needs to first be on growing the size of the pie and then worry about who gets what share. RDA GW believes industry with government support and backing can concurrently investigate options to grow industry, grow sugar and grow bioproducts manufacturing and derive equitable sharing of investment risk and return proceeds. Such a focus we suggest will generate more confidence within producers and with confidence comes more interest and positivity toward farm and industry



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- iv. expansion and improved or farm business ownership succession and more general interest in farming.

11. Consideration of Food v/s Fuel

- i. Australia is well placed in terms of food security, although a growth in biomanufacturing and aligned biobased feedstock will undoubtedly increase competition for supply and access to land to support production. Producers will choose what to grow based on what is most economic and commercial for them aligned to market returns.
- ii. RDA GW suspects the sustainability credentialing of biofuels production will be particularly important as it has a direct relationship with GhG emission validations, and broader eco market parameters, which will become increasing important to the eventual price that can be obtained for the bioproducts.
- iii. In this context activities that can increase feedstock production through vertical productivity increases, more active use of regenerative agriculture practices, increases best practice farming operations and inputs and increased use of byproducts such as bagasse, will likely be favoured by bioproduct consumers and buyers. Calculation and validation of ESG parameters specific to Australia and consistent with global certification with will also be critical.

2025 Primary Industries and Resources Committee - Sugar Industry bioenergy opportunities in Queensland

29th September 2025



Regional
Development
Australia
GREATER WHITSUNDAYS



1. Regional Bio Manufacturing Circular Economies

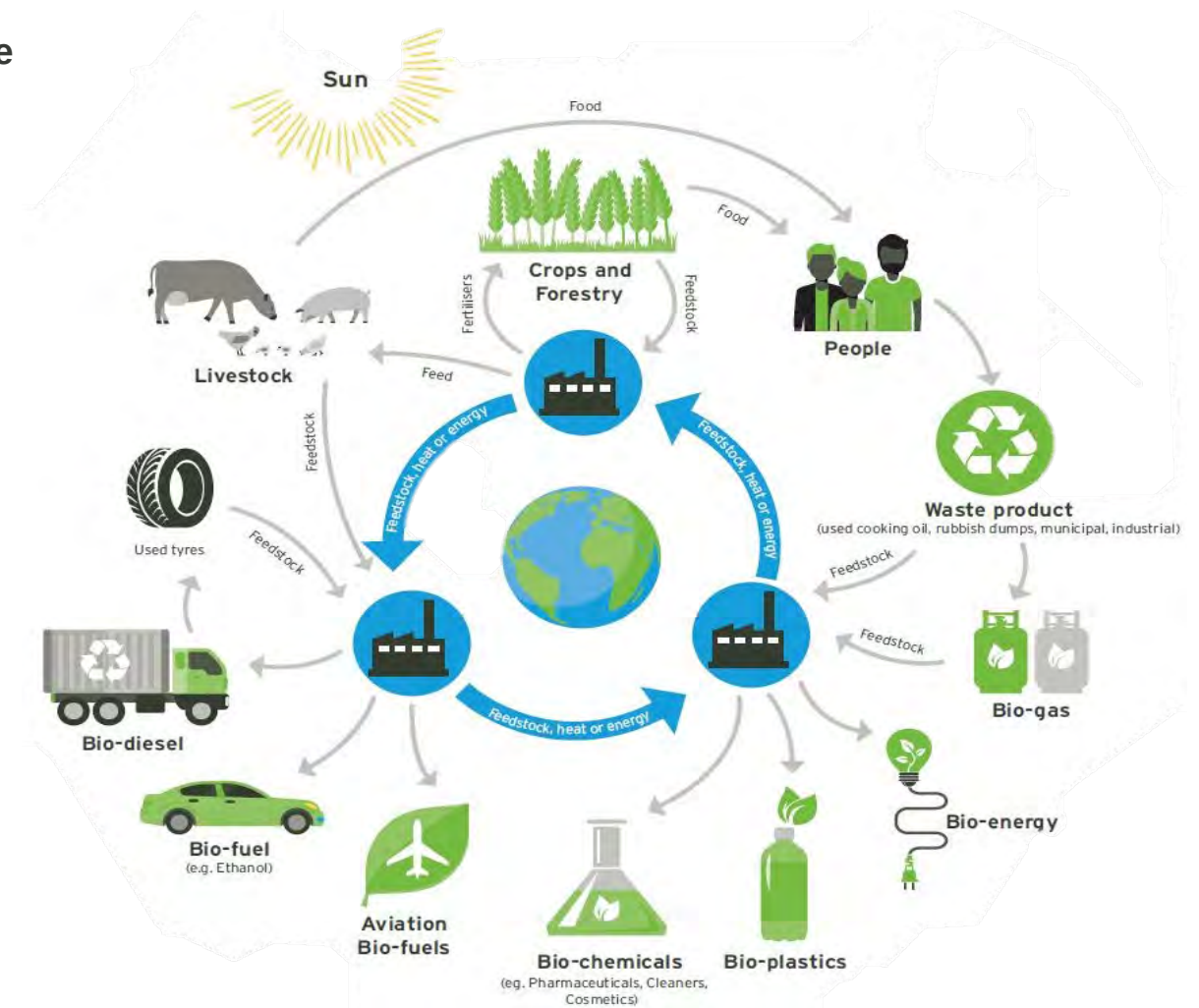
Queensland Regional areas can integrate bio-industries to connect with domestic and export market opportunities.

What would an integrated a bio-industry look like for the Greater Whitsunday regions?

This infographic describes the desired future state and the overall interrelationship of the various bio industry value chains.

Circular bio-economies can deliver:

- Resilience for local economies and workforces
- Productive use of 'waste' products
- Opportunities for efficiency and shared infrastructure
- Knowledge sharing and skilled workforces
- Opportunities to reduce local environmental impact



2. Market Potential: Value Added Products from Bio-refineries

Current Bio-Products



Product Categories



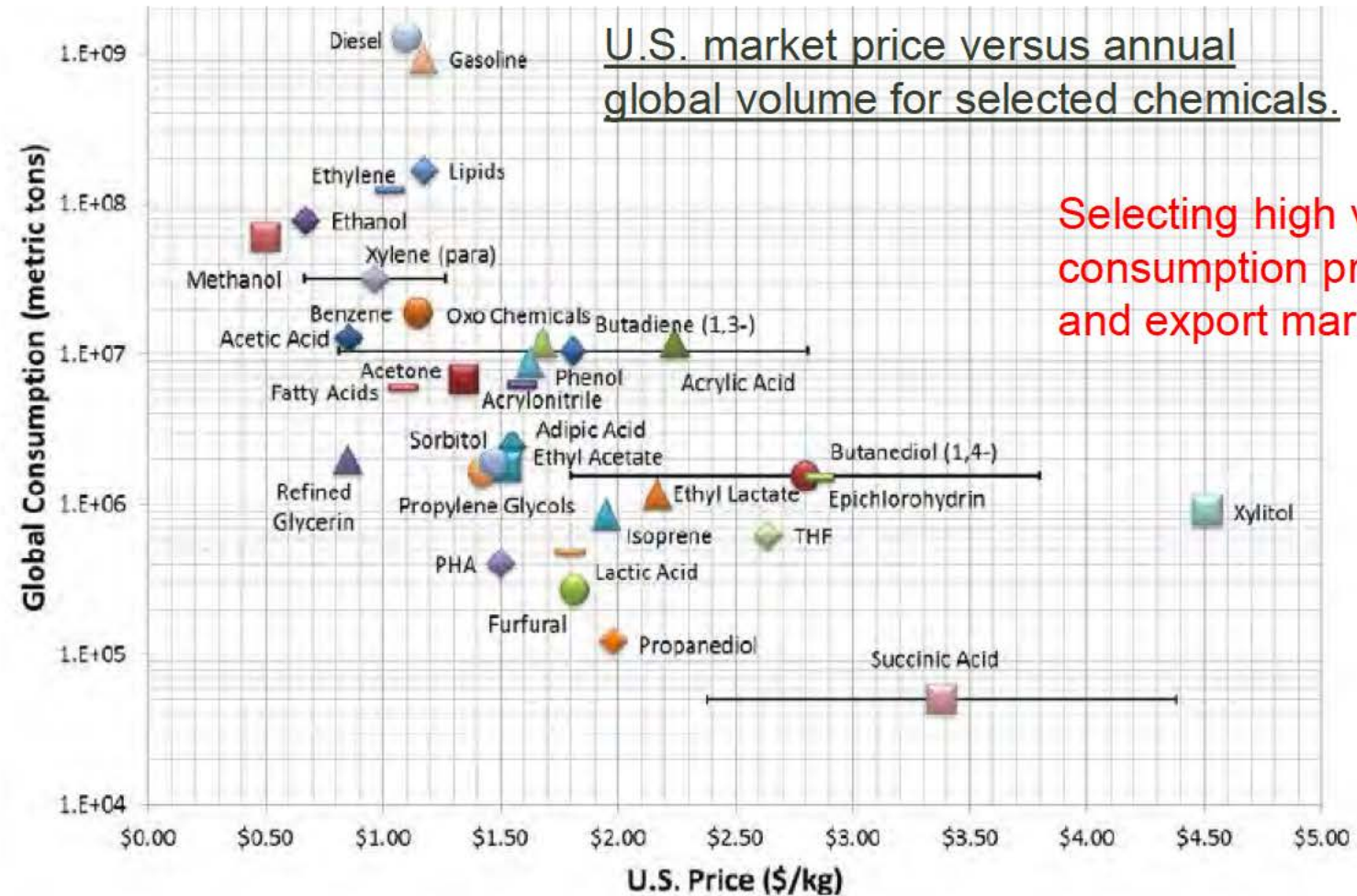
Figure 2. Spectrum of marketable bio-based "products" [IEA Bioenergy Task42]

3. You have to start with the market and work backwards

BCC Research (www.bccresearch.com) predicted the global market for bio-products is expected to grow to **\$900 billion by end 2030**.

The **non-energetic bio-products** category, which includes chemicals, pharmaceuticals and materials, is the largest and fastest moving segment in this market and is expected to reach **\$600 billion by end 2030**

Energetic bio-products, including production technologies such as direct combustion in heat and power applications is projected to reach **\$400 billion by end 2030**.



Selecting high value, high consumption products for local and export markets is key.

The Australian Bio-products market is still developing.

4. The Next Big Thing is Supply Chain Considerations

It is critical to address the key technical and economic issues for establishing bio-industries in Queensland across the entire 'farm to port' value chain

Commercialising and realising bioprocessing industries requires a solid understanding of the core market and cost drivers, including:

- agricultural systems,
- processes,
- technologies, logistics,
- offtake agreements,
- energy,
- distribution methods
- equipment design
- understanding of the economic issues

There are many interrelated value chains that need to be established for the development of successful industries.

Bio industry projects created by the 'Demand side' of market opportunities need to be weighed up with realistic assessments of the potential growth on the 'Supply side', if sustainable businesses are to be developed.

The commercial and financial reviews must consider each of the following demand and supply side influencers:

- 1 Feedstock Suppliers** – Businesses that provide renewable or biomass feedstocks for conversion to bioproducts.
e.g. cane growers, grain growers, grain legumes producers, used cooking oil (UCO) collectors, animal and marine fat and oil manufacturers, green waste collectors, timber processors, municipal solid waste, wastewater treatment plants, algae producers etc
- 2 Bio-Product Processors** – Organisations that use renewable or biomass feedstocks and convert them to bioproducts.
e.g. ethanol producers, biodiesel producers, biogas producers, agricultural product processors, other bio product producers etc
- 3 Bio-Products Customers** – Industries who purchase bioproducts.
e.g. trucking companies, mining companies, fuel companies, chemical processors, manufacturing companies, stock feed manufacturers, fertilizer applicators, etc
- 4 Supply Chain Logistics** – Organisations who are involved in the transport and distribution of feedstocks and bioproducts.
e.g. harvesting operators, trucking companies, rail operators, port operators, distributors etc
- 5 Research and Technology Providers** – Organisations that are involved in the development of biotechnologies for commercial applications.
e.g. universities, chemical companies, microbiologists, equipment providers, Original Equipment Manufacturers (OEMs), agronomists, scientific and engineering companies
- 6 Industry Facilitators** – Organisations, associations, bodies and panels that represent constituents in the bioproducts value chain, and who provide advocacy and facilitate development of the industry
- 7 Investors, Entrepreneurs and Innovation Brokers** – Companies and entities that provide investment, and facilitation for emerging biofutures opportunities

5. Greater Whitsunday Bio-Manufacturing Regional Strategy

The brochure 'Greater Whitsunday Biomanufacturing Blueprint 1.0' was finalised by GW3 in 2023 to provide input to prospective investors for future Bioenergy Projects



A DIVERSE FEEDSTOCK PROFILE

Greater Whitsunday Feedstocks

 Cropping	• Sugar • Sugarcane trash • Sugarcane bagasse • Sugarcane fermentation • Sorghum straw • Grain and pulses from local regions • Yeast and vinasse from ethanol processing
 Food processing	• Meat processing - tallow
 Timber	• Wood waste
 Horticulture	• Grains • Horticultural residues • Bananas • Tomatoes • Capsicums • Mangoes
 Intensive livestock	• Cattle, poultry and pig manure • Aquaculture waste - prawns, barramundi

Source: Queensland biomass mapping and data tool www.qld.gov.au/industry-development/queensland-biomass-mapping-and-data-tool

Greater Whitsunday Feedstock Volumes

The current top seven feedstock volumes in the Mackay Isaac Whitsunday region (dry tonnes per annum) are:

Sugarcane trash 1,518,000	Cattle feedlot manure 17,090
Sugarcane bagasse 1,386,000	Sorghum waste 12,810
Paper waste 38,610	Meat processing 10,850
Timber waste 20,730	

Source: Queensland biomass mapping and data tool www.qld.gov.au/industry-development/queensland-biomass-mapping-and-data-tool

Emerging Feedstocks in Greater Whitsunday



Beef tallow

5% of Australia's beef is produced in the Greater Whitsunday region and meat processing from the Thomas Borthwick & Sons facility at Bakers Creek, delivers potential feedstock from a variety of by-products, including tallow



Horticulture waste

Home to one of the largest winter produce growing regions in Australia, including tomatoes and capsicums, and additional horticulture waste, including mangoes, that can be converted into high value bioproducts such as bioplastics, biofuels, animal feeds, pharmaceuticals, nutraceuticals and cosmetics



Oilseeds and crops

Oilseed and broadacre crops, including chickpeas, sorghum and wheat, are well established within the region with opportunities for crop expansion on available land including mine rehabilitation areas or fallow ground



Aquaculture

A burgeoning regional industry with existing synergies between bioprocessing facilities and by-products from waste



Algae

The region provides ideal conditions for the cultivation of algae as demonstrated by established algae farms, opportunities in mine site rehabilitation, as well as by-products from aquaculture developments, creating value-add opportunities due to its high feedstock yields

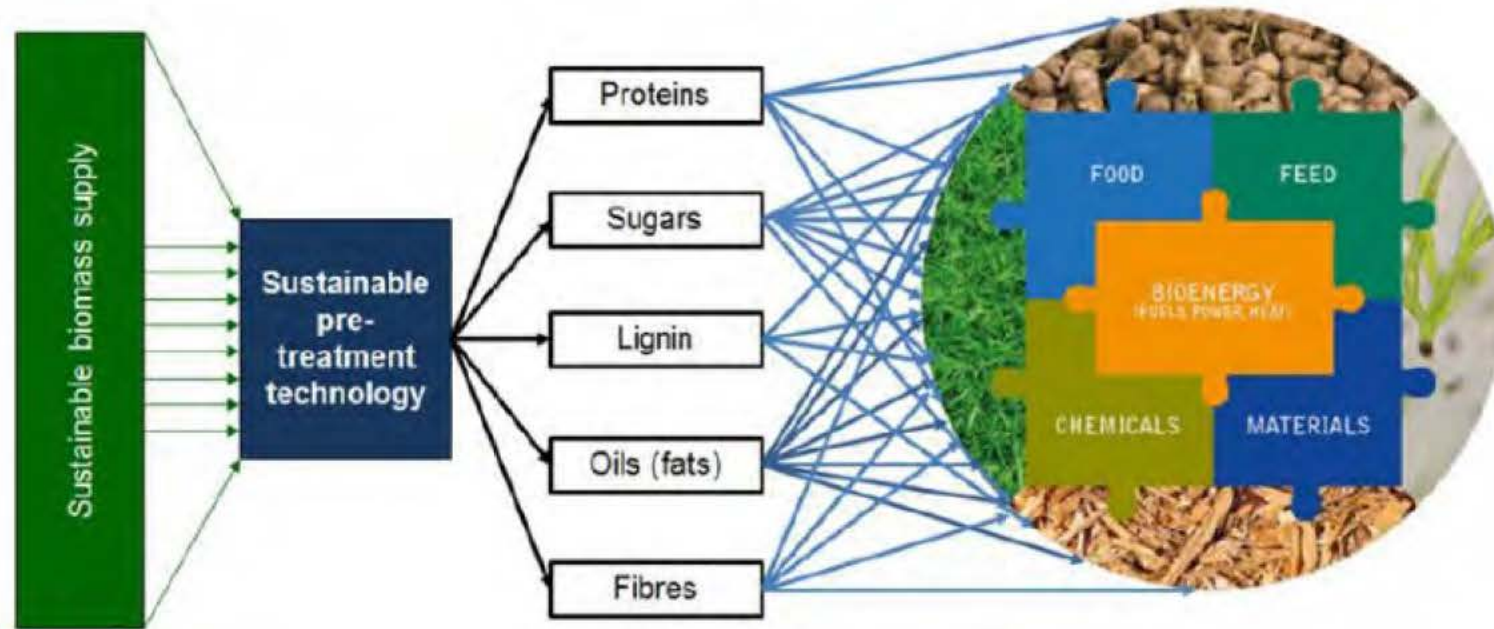


Industrial waste

An example of industrial waste as a feedstock are end-of-life mining tyres and conveyor belts, which are being utilised by Australian innovators Novum Energy in biomanufacturing processes to reclaim carbon, develop a bio-cogeneration system and produce high-grade by-products like fuel oil, syngas, carbon black and steel

6. Biorefining opportunities for Australia

IEA Bioenergy Task 42 platforms for Biorefining opportunities



- Australia is one of the few western countries with a natural advantage with abundant land and sun to be able to grow plentiful sugars amongst other biological precursors
- There is potential for a significant export industry if Australia got the policy and finance settings right
- Sugar markets are (and likely will be) under pressure
- Policy settings at this time do not appear to be supportive enough to get an industry developing
- Even with the right policy settings biochemicals is still an evolving industry which will require Australia to invest risk capital which is currently one of the weaknesses in the macro environment

7. Bioenergy opportunities for Australia

ARENA have identified 8 key areas to transition energy types:

Bioenergy opportunities for Australia



Displace natural gas in industry



Electricity generation



Heat from waste



Liquid fuels for the transport sector



Modular and small scale applications



Behind-the-meter or self-consumption



Storage and balancing



Dispatchability



ARENA

THEME 1: ENABLING MARKET OPPORTUNITIES IN HARD-TO-ABATE SECTORS



Industrial renewable heat

- Raise the profile of bioenergy solutions and successful project case studies
- Educate industrial heat consumers about bioenergy solutions and benefits
- Provide financial support for feasibility studies to encourage uptake and scale-up
- Explore ways to overcome short project payback expectations

- Review market developments periodically to ascertain future priorities and efforts



Sustainable aviation fuels

- Communicate the role and benefits of biojet fuels to the community
- Coordinate public-private partnerships across all stakeholder groups to develop the market
- Assess opportunities in foundation sub-markets such as the Royal Australian Air Force or regional routes
- Encourage research, pilots and trials focusing on the demonstration of advanced biojet fuels from non-food resources at commercial scale

- Assess ways to bridge the economic viability gap such as lowering production costs for biojet fuel production in the long term



Renewable gas grid injection

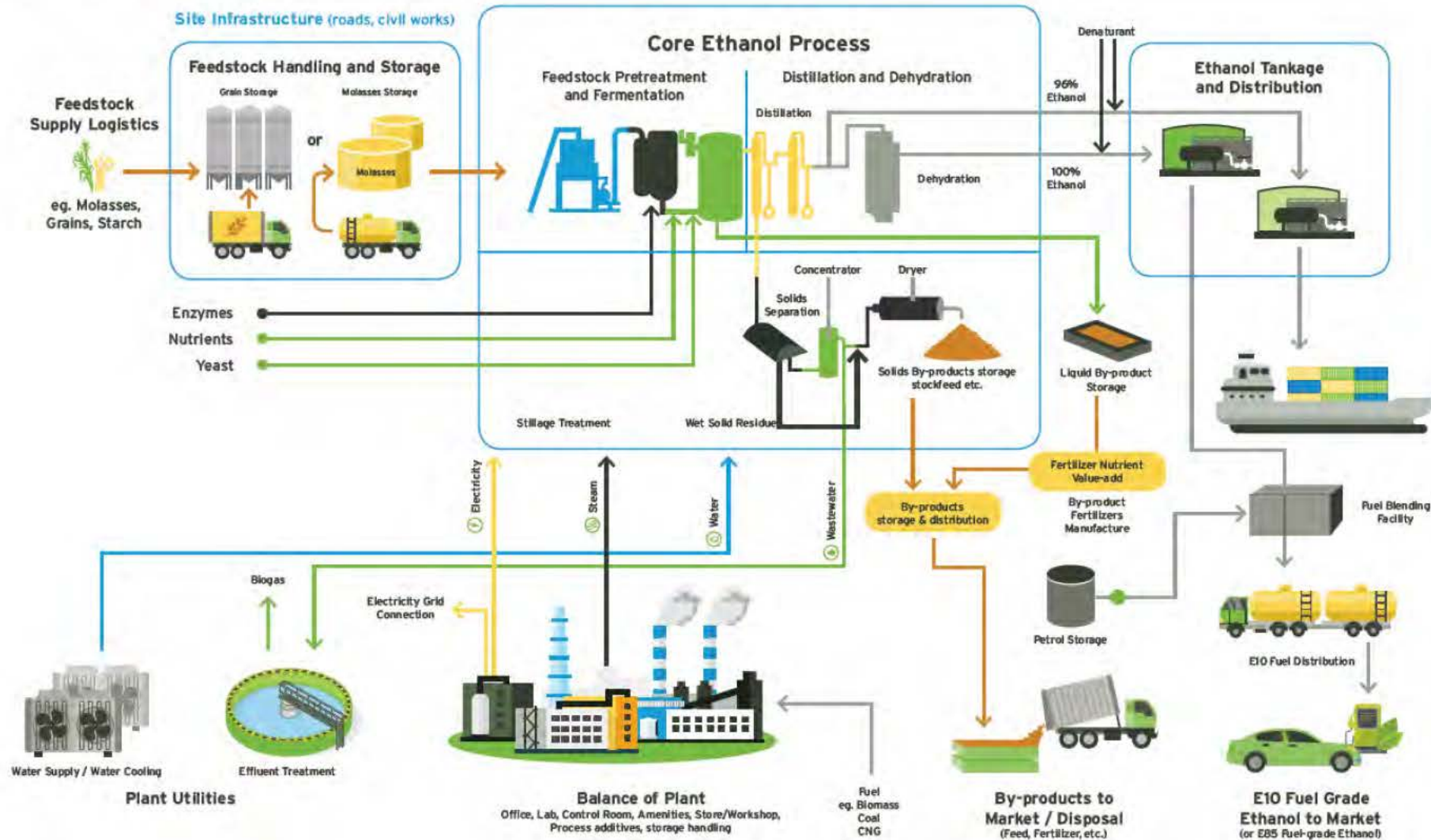
- Develop a certificate of origin scheme to complement the work underway on hydrogen
- Clean Energy Regulator to finalise Emissions Reduction Fund methodologies underway recognising biomethane injection into gas networks
- Pursue a uniform regulatory approach for digestate specifications and use
- Continue to assess the appropriateness of the natural gas specifications for biomethane grid injection and implement amendments to the National Gas Law so it extends to renewable gas blending to provide more legal certainty for industry^a

- Assess ways to bridge the economic viability gap such as lowering production costs for biomethane production from anaerobic digestion
- Promote the ongoing development of case studies focusing on biomethane production from anaerobic digestion

8. Bioethanol example value chain scenarios

The following infographic demonstrates the typical value chains that are needed to develop a Bioethanol industry:

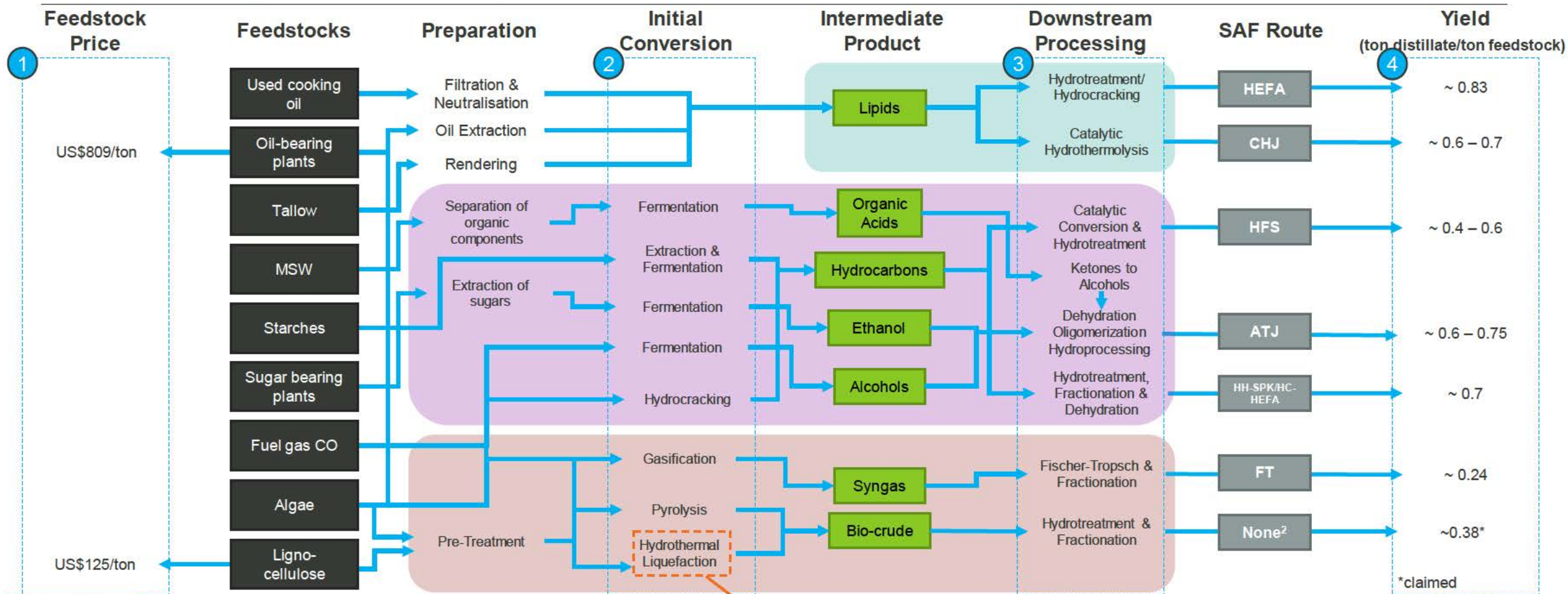
Bio-Ethanol Infographic



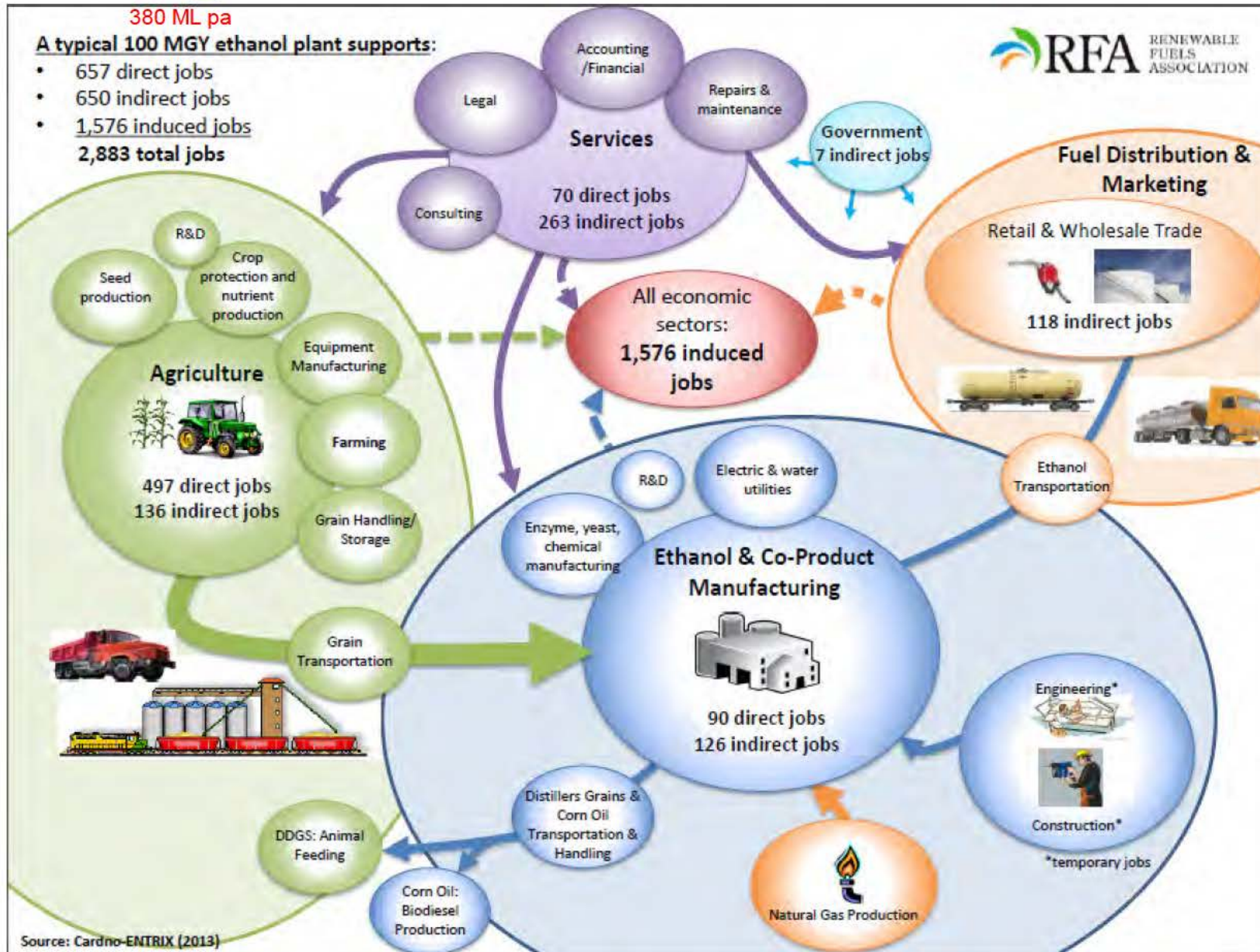
9. SAF sustainable aviation fuel production routes

SAF is complicated - While lipid and biochemical conversion routes are more mature, thermochemical conversion routes can process lower-order waste streams, resulting in an increased focus on these pathways.

Pathways for SAF production (1/2)¹ - diagram



10. Example of Economic benefits of typical US Integrated Biofuel Ethanol Plants



11. Heavy Haul transport trends for Australia

PROVEN PERFORMANCE

Shipping, rail and trucking present the most immediate Biofuel opportunities



- Bioenergy offers immense potential to slash emissions from cars, trucks, ships, and planes by replacing fossil fuels with renewable, low-carbon alternatives like ethanol, biodiesel, and biojet fuel made from organic waste and purpose-grown crops.
- Forward-thinking policies and investments can accelerate the transition, from vehicle emission standards to biofuel production incentives.
- Biofuels can enable Euro 6 compliant engines when 'dirty' spec imported fuel is taken into consideration.
- Biofuels will also give a major reduction in CO2 reduction thus making a difference to GHG emissions